

PREDATOR ACTIVITY AND GRASSLAND BIRD NESTING SUCCESS IN AN AGRICULTURAL  
LANDSCAPE OF SOUTHERN WISCONSIN  
2004 Field Season Report

Travis Anderson and Christine Ribic, USGS Wisconsin Cooperative Wildlife Research Unit, Department of Wildlife Ecology, University of Wisconsin-Madison, 204 Russell Labs, 1630 Linden Drive, Madison, WI 53706.

## **Introduction**

Grassland birds have undergone a dramatic decline in population over the last 30 years. These declines have been attributed in part to the loss of native and secondary grasslands in favor of a more agricultural landscape. Remaining grasslands are often found to be highly fragmented and small in size, increasing possible edge effects that could lead to higher predation rates on nesting grassland birds. However, little is known regarding predator usage of certain edge types, which predators play the biggest role in nest depredations, and how important “edge effects” are to the success of the grassland bird community.

The primary objectives of this study are to (1) determine the community of avian nest predators on the study area, (2) determine the effect of edge composition (wooded vs. non-wooded) and vegetation (Conservation Reserve Program (CRP) grassland, prairie, and pasture) on predator activity, and (3) determine the predator’s use of the landscape.

This report summarizes the work accomplished during the study’s second field season, May-July 2004.

## **Study Area**

Our study took place in an area southwest of Madison, WI located south of Hwy 151/18 in western Dane County, eastern Iowa County, and northwestern Green County. Land use in this area is agricultural, with much occurring as hay, pasture, and small grains. There is also high enrollment of land in the CRP and prairie remnants can be found on The Nature Conservancy (TNC) properties and elsewhere. TNC has outlined part of this area as land with great importance to the preservation of prairie species and conservation of grassland birds, known as the Military Ridge Prairie Heritage Area (MRPHA), and much of our research occurred within its boundaries.



Most study sites were privately owned while the majority of prairie sites were found on publicly owned land. CRP sites were composed of non-native cool season grasses, while prairie remnants contained native warm season grasses and forbs, with few non-native plants. Pastures contained cool season grasses and were grazed at some point during the field season.

In 2004, southwestern Wisconsin experienced higher than normal rainfall totals in the months of May and July, with May being the wettest in 50 years (10.8 inches: new record). The result was a decline in effort for track stations and the amount of time they were available to “capture” animals. Data collected for many species was much less in 2004 than in 2003.

## **Methods**

### *Sand Track Stations*

Sand track stations were used to monitor predator activity along edges (wooded vs. non-wooded) in CRP (n=7), prairie (n=4), and pasture (n=4) from 17 May through 23 July 2004. Each site had a total of eight track stations, with four occurring along a wooded edge, and four along a non-wooded edge. CRP sites also had interior track stations (four) if large enough. Interior track stations were not placed at prairie sites due to concern over disturbance to native plants, or pasture sites because of disturbance from cattle. Track stations along edges were spaced 30 meters apart, with the starting point at least 50 meters from a change in edge type. Interior track stations were placed at least 100 meters from the nearest edge and closest to the center of the field. These track stations were also placed in a line and spaced 30 meters apart. One CRP site had mowed trails through the interior, so it did not receive interior track stations. A wooded edge was defined as having woody vegetation at least six meters tall and a view obstructed across the edge. A non-wooded edge was defined as an edge having an unobstructed view across the edge and little or no woody vegetation present (1-2 single trees were allowed along the edge).

Track stations consisted of 5 gallons of sand mixed with 1 cup of mineral oil, which was leveled in a 1-meter squared circle of removed sod. An unscented, 1-inch diameter Plaster of Paris, white tablet was placed in the center to act as a visual stimulus to attract an animal to the station and leave its track. The mineral oil helped to maintain track clarity by keeping the sand moist, and did not have an unusual scent that may attract predators.

Prairie sites were treated differently than others due to the concern of native plant species. Sod was not removed in track stations, but vegetation was clipped and sand leveled on top. Vegetation was trimmed back during

the season to maintain track clarity in all stations at all sites, and great care was taken to minimize human scent at and between track stations during data collection. Track stations were checked every other day.

#### *Motion triggered cameras*

We used heat sensed, motion triggered cameras (RECONYX<sup>TM</sup> and Camtrakker<sup>TM</sup>) to monitor animal activity along edges (wooded and non-wooded) of grasslands. The study area was divided into a grid of seven blocks each 16-square miles in size (Figure 1). These were further divided into four sub-blocks (28 total) that were 4-square miles in size. Each sub-block was to receive a camera, but four did not due to no landowner permission. For 2004 we had 24 camera sites, divided into 14 wooded edge sites and 10 non-wooded edge sites. Definitions of wooded edges and non-wooded edges followed the same used with track stations.

Cameras were placed on their defined edge near areas of animal activity, such as trails or game paths. Cameras remained in the same location for at least 21 days, and were moved to a new location on site if few pictures were being taken at the previous location. Edge type remained consistent for moved cameras (i.e. a wooded edge camera remained on wooded edges all season). Cameras were in the field from 25 May until 22 July 2004.

#### *Nest Cameras*

Miniature infrared video cameras were placed on selected grassland bird nests to determine success or failure, and if failure, what caused it. The decision to place a camera depended on accessibility, nest location (i.e. near edge or interior), and vulnerability to theft. Nests were found by a companion grassland bird study and cameras were placed at nests at or soon after egg laying ended to lessen chances of abandonment. The camera system consisted of a remote infrared camera, time-lapsed videocassette recorder, and 12-volt marine battery; the recorder and battery were 25 m away from the camera. Cameras were checked daily to change tapes and perform necessary maintenance, and batteries were switched every other day.

#### *Vegetation*

Vegetation measurements were taken at each track station site using the Robel method (Robel et al. 1970) to measure height-densities. Measurements were taken twice during the year, once during the first weeks of June and July. Each site was divided into edge and interior categories, with 10 random samples taken in each. Samples were taken 30 meters apart in a transect with a randomly chosen starting point. Edge samples fell within a range of anywhere between 0-100 meters from the edge of a field, while interior samples had to fall greater than 130 meters

from any edge. Height-density was recorded as an average of measures (one from each cardinal direction) at which the pole was obscured by vegetation.

## **Results**

### *Sand Track Stations*

We identified 21 species in sand track stations (Table 1) for the 2004 field season, with 11 being known to depredate nests (in ranked order of detection): raccoon, thirteen-lined ground squirrel, coyote, red fox, house cat, striped skunk, badger, opossum, snake sp., weasel sp., and dog. All were found on all three grassland types (CRP, prairie, and grazed pasture).

Preliminary analysis of the data suggests that raccoons were the most recorded predator species in CRP and grazed pastures, but did not show a significant difference in activity between wooded and nonwooded edges. On prairies, raccoon seemed to be most active on wooded edges. Thirteen-lined ground squirrels were second to raccoons on CRP and were the most detected predator in prairies, but were rarely recorded on grazed pastures. Coyotes were detected most often in CRP, and activity seemed to be similar between edge types across all treatments.

On interior track stations (CRP only) thirteen-lined ground squirrels (50 hits) and coyotes (21 hits) were most numerous detected. Coyotes had nearly as many interior hits as combined edge hits (25). Thirteen-lined ground squirrels were detected 35 times along edges in CRP, but 34 were along the non-wooded edge. Raccoon (8), badger (7), red fox (6), and skunk (1) were rarely detected on interior stations, and opossum was not detected.

### *Motion Triggered Cameras*

Over 1100 pictures of 15 different species were taken during the 2004 field season (Table 2) with white-tailed deer being the most numerous (491 pictures). Raccoon was second with 345 pictures and were photographed on wooded edges significantly more than non-wooded edges, 319 and 26 pictures respectively. Other notable photographed species included: turkey (106), dog (20), cat (10), opossum (10), coyote (8), red fox (5), striped skunk (1), and badger (1).

### *Nest Video Cameras*

Miniature video cameras were placed on seventeen nests this field season (Table 3). Species with monitored nests were eastern meadowlark (10), Henslow's sparrow (3), bobolink (2), grasshopper sparrow (1), and western meadowlark (1). Cameras were placed on nests in CRP (n=13 nests) and prairie (n=4 nests). Predation

events were documented on twelve nests in 2004 (Table 4). For the first time, a weasel species was caught on film depredating a grassland bird nest in southern Wisconsin. Raccoon, thirteen-lined ground squirrel, and red-tailed hawk were the only repeat species from 2003. Thirteen-lined ground squirrel and weasel were the only two species to have multiple depredation events in 2004.

## **Discussion**

Similar to previous work done in southern Wisconsin, raccoons were the most highly detected nest predator on track stations and motion-triggered cameras. Track station data shows that raccoons may be significantly more active along edges, but a difference between wooded and nonwooded edges was not evident in 2004. In contrast, motion-triggered camera data shows that raccoons use wooded edges most often. Raccoons were captured on video depredating nests in both 2003 and 2004, however, documentation of thirteen-lined ground squirrels and red-tailed hawks (2003 and 2004), and coyotes (2002) depredating nests means that other predator species also take a toll on grassland birds. These species have been shown to have little or no edge preference in their activities, and could use interior areas of grasslands more frequently. This raises the question: Will managing grasslands to minimize “edge effects” help grassland bird nest success, or will it simply change which predator species are more commonly found in the ecosystem? Clearly though, grassland birds face a large and diverse suit of predators in southwestern Wisconsin and more information is needed to understand their relationships.

## **Acknowledgments**

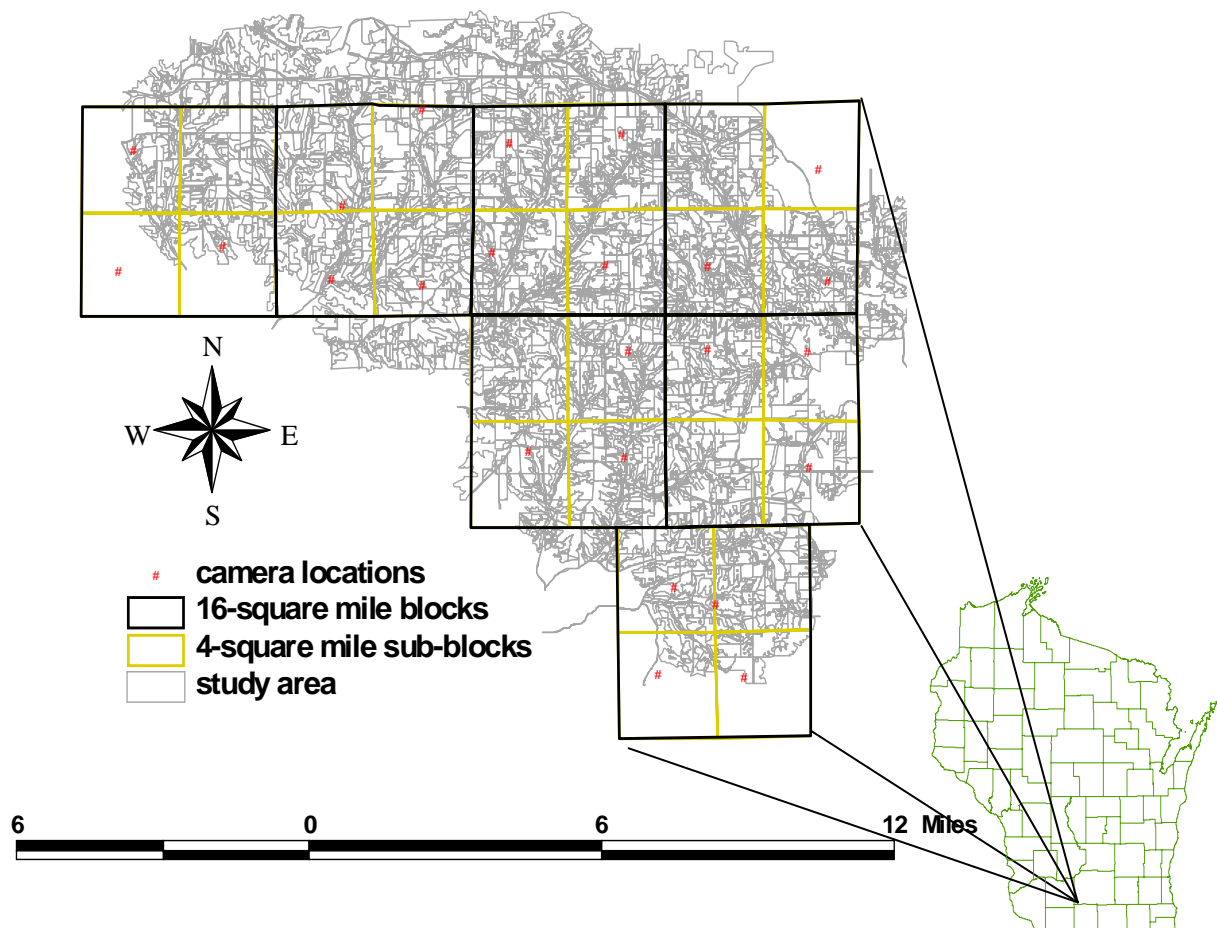
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## **Literature cited**

Robel, R. J., N. Briggs, A. D. Dayton, and L. C. Hulbert. 1970. Relationships between visual obstruction measurements and weight of grassland vegetation. *Journal of Range Management* 23:295-297.

Figure 1. Map of study area showing motion-detected camera locations within the 16-square mile blocks and 4-square mile sub-blocks grid.

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**Table 1. Summary of track station data for 2004. Data shown as total hits per edge per treatment.**

Species	CRP (n=7)				Grazed Pasture (n=4)			Prairie (n=4)			Grand Total
	I	N	W	Total	N	W	Total	N	W	Total	
raccoon	8	41	51	100	29	31	60	5	27	32	192
13-lined ground squirrel	50	34	1	85	2	1	3	50	5	55	143
coyote	21	9	16	46	8	11	19	4	3	7	72
red fox	6	1	11	18	3	1	4	5	7	12	34
cat	0	2	9	11	6	12	18	3	2	5	34
skunk	1	7	8	16	1	1	2	2	2	4	22
badger	7	1	1	9	1	0	1	2	2	4	14
opossum	0	1	6	7	0	2	2	2	0	2	11
snake sp.	1	2	2	5	0	3	3	0	1	1	9
weasel sp.	3	1	0	4	0	1	1	0	1	1	6
dog	0	1	0	1	0	0	0	2	0	2	3
cottontail	1	56	122	179	10	25	35	5	73	78	292
deer	28	42	126	196	5	5	10	26	39	65	271
turkey	11	27	22	60	23	32	55	5	9	14	129
crow	10	3	2	15	5	12	17	10	4	14	46
rodent sp.	5	6	13	24	1	3	4	5	8	13	41
pheasant	13	9	0	22	1	1	2	5	2	7	31
squirrel sp.	0	3	5	8	3	6	9	0	4	4	21
mole sp.	0	0	3	3	5	1	6	0	0	0	9
woodchuck	0	1	2	3	0	0	0	0	0	0	3
chipmunk	0	0	2	2	0	0	0	0	0	0	2
											1588

I=interior  
N=nonwooded  
W=wooded

**Table 2. Summary of motion-triggered camera data for 2004. Data shown as number of pictures taken per species per edge.**

Species	Edge type		Grand Total
	nonwooded	wooded	
deer	80	411	491
raccoon	26	319	345
turkey	6	100	106
bird sp.	13	35	48
squirrel sp.	0	29	29
cottontail	0	22	22
dog	16	4	20
opossum	2	8	10
pheasant	1	9	10
cat	0	10	10
coyote	5	3	8
red fox	1	4	5
badger	0	1	1
striped skunk	0	1	1
mallard	0	1	1
			1107



**Table 3. Summary of nests with cameras in 2004.**

Species	# nests	successful	depredated	partial dep	
EAME	10	3	5	2	EAME: eastern meadowlark
WEME	1	1	0	0	WEME: western meadowlark
BOBO	2	0	2	0	BOBO: bobolink
HESP	3	1	2	0	HESP: Henslow's sparrow
GRSP	1	0	1	0	GRSP: grasshopper sparrow
Total	17	5	10	2	

**Table 4. Summary of depredating species caught on tape in 2004.**

Trt	Nest Species	Fate	Depredating species	Comments
CRP	BOBO	depredated	opossum	Opossum eats 3 chicks and 3 eggs
CRP	BOBO	depredated	dog? (canid)	Need further confirmation on depredating species; 5 eggs removed
CRP	EAME	depredated	red-tailed hawk	Hawk eats 4 chicks
CRP	EAME	depredated	striped skunk	Skunk eats 6 eggs
CRP	EAME	depredated	unknown	VCR failure; nest was partially dep; adult aband. nest w/1 chick remaining (dead)
Prairie	EAME	depredated	badger	Badger eats 5 chicks
CRP	EAME	depredated	raccoon	Raccoon eats 6 eggs
Prairie	EAME	partial dep	13-lined ground squirrel	Partial deps: (6/26) 13-gs eats 1 egg; (6/29) 13-gs eats 1 chick; 2 chicks fledge
CRP	EAME	partial dep	weasel sp.	Partial dep: (7/06) weasel (short-tailed?) eats 3 chicks; 1 chick fledges
CRP	GRSP	depredated	vole sp.	Vole ate/removes 4 chicks, killed 5th, and injures(?) adult
CRP	HESP	depredated	weasel sp.	Weasel sp eats 5 eggs
CRP	HESP	depredated	13-lined ground squirrel	13-lined g.s. eats 4 chicks and 1 egg